25 Years of RiverTrends
A Volunteer Water Quality Monitoring Program

RiverTrends is a regional network of trained and Alliance-certified volunteers who perform weekly or monthly water quality tests that help track the condition of waters flowing toward the Chesapeake Bay. Over 400 citizen scientists across the Chesapeake Bay region - in Maryland and Virginia - have participated since the Alliance for the Chesapeake Bay's RiverTrends program began in 1985. Some have monitored for more than fifteen years, watching their rivers through the seasons and regularly submitting the valuable data they collect. Volunteers learn to be stewards of their rivers and foster this ethic in their community. Over 300 sites (see map) have been monitored under the RiverTrends program. Currently the program is focused in Virginia, with 40 active sites.


Map of 64,000 square mile Chesapeake Bay watershed with active and historic RiverTrends sites.

Water Quality Tests Provide Valuable Data

RiverTrends monitors test waters for dissolved oxygen, temperature, pH, salinity (where appropriate), bacteria, and water clarity. Monitors also collect general observation and rainfall data. Theses parameters provide valuable information for identifying water quality issues and potential pollution sources within a watershed.

Parameter	Description
Dissolved Oxygen (DO)	One of the most important indicators of water quality and essential for aquatic life. Excess nutrients fuel algae blooms, which use up the oxygen when they decompose. Warm water holds less oxygen, so low DO can be an issue in the summer. The Virginia water quality standard is 5.0 mg/L for open waters and 4.0 mg/L for tidal and nontidal waters.
pH	Measure of acidic or basic concentration. pH needs to be between 6.0 and 9.0 to support aquatic life.
Water Clarity	Material that mixes with and becomes suspended in water will make the water turbid (dirty). This usually happens during rain events, because stormwater runoff carries excess sediments to streams. Turbidity affects aquatic life by interfering with the penetration of sunlight. Underwater grasses require light for photosynthesis, which also provides oxygen for fish and habitat for young aquatic life.
Bacteria	*E.coli* is a type of fecal coliform bacteria that is used to indicate fecal waste in water. It is much safer to test for *E.coli* than directly test for the presence of pathogens (disease causing organisms). Since fecal coliforms enter water using the same vector (in this case fecal waste) as pathogens, significant amounts of fecal coliform bacteria may indicate an increase risk of exposure to pathogens. The Virginia water quality standard for *E. coli* (for a one time monthly sample) is 235 *E. coli* colonies per 100 ml.

Stormwater Runoff Impacts Watershed Systems
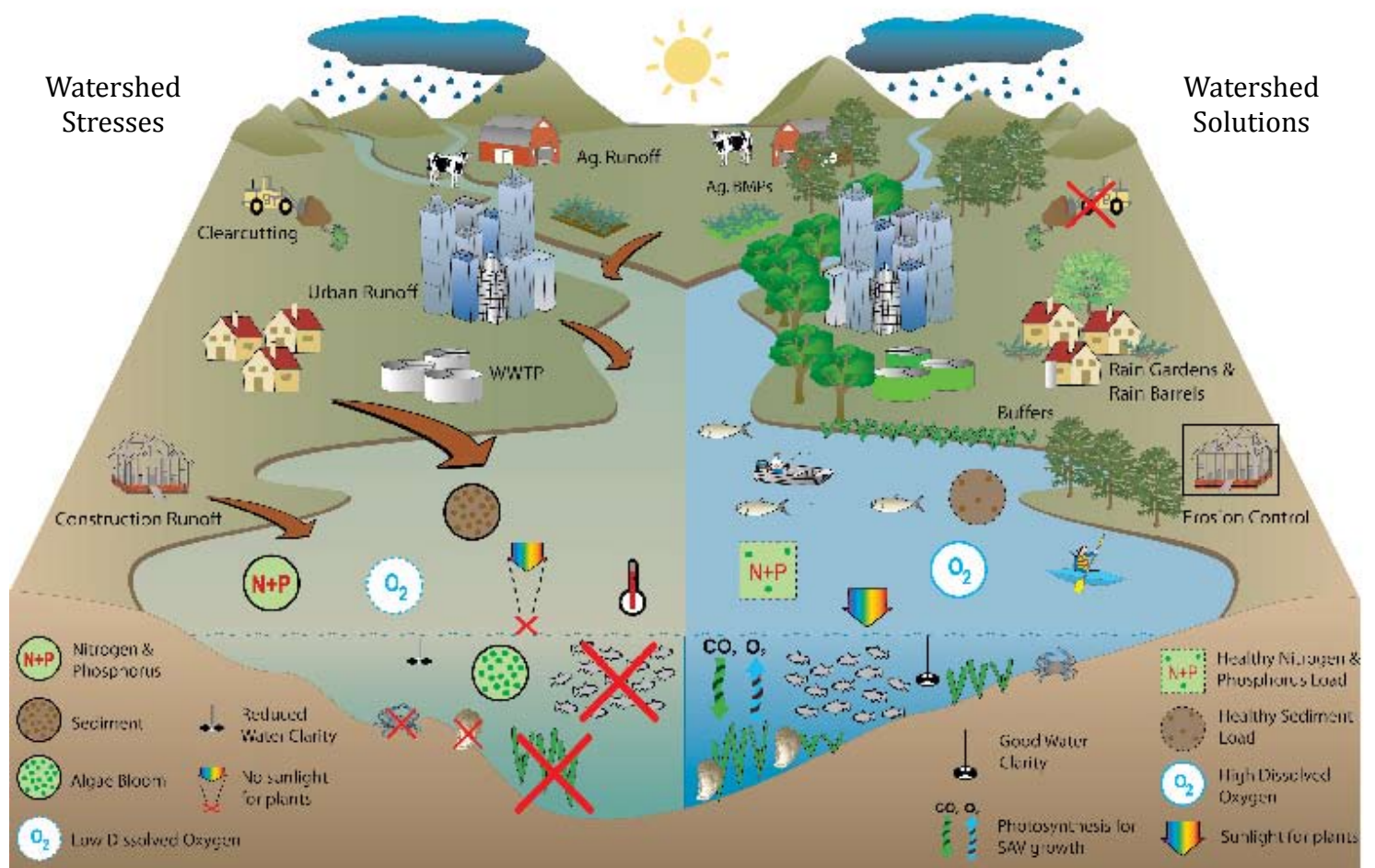
Symbols courtesy of the Integration and Application Network (ian.umces.edu/symbols/).

Citizen Scientists Partner with State Agencies

RiverTrends and other citizen water quality monitoring programs throughout Virginia help supplement the high-quality data that VA Department of Environmental Quality (DEQ) uses to assess streams and rivers. Citizen scientists collect data on streams and tributaries where DEQ does not have the resources to monitor. For example, four RiverTrends sites in the Totuskey Creek watershed supplement data collected at the DEQ Trend station (see map). These stations also provide tributary level data, while the DEQ Trend stations collect data on the Rappahannock River.

The Alliance has a VA DEQ approved Quality Assurance Project Plan (QAPP), which sets standards for data collection that assure the data are comparable to data collected by universities and government agencies. Alliance-certified monitors gather data that are submitted to the online database and forwarded annually to VA DEQ for use in the Virginia's 305(d)/303(b) Integrated Water Quality Assessment Report to EPA. The general public can also access RiverTrends Data online by visiting http://www.acb-online.org/monitoring/data/site.cfm.

Rappahannock River

•	DEQ Trend Sites	
◆	RiverTrends Sites	
	Totuskey Creek Watershed	

0 0.5 1   2
Miles
N

DEQ and volunteer sites in Totuskey watershed.

RiverTrends Continues to Grow

In addition to submitting data to VA DEQ, the RiverTrends program has begun using volunteer data to develop watershed report cards. In 2010, the Alliance partnered with Friends of Rappahannock to publish "Hazel Run: A Watershed at Risk", which focuses on bacteria issues in the tributary to the Rappahannock River. A 2011 Totuskey Creek Report Card shows trend data for this tidal Rappahannock tributary.

The Alliance is also piloting nutrient analysis in the Hazel Run watershed in the City of Fredericksburg and the Reedy Creek watershed in the City of Richmond. High-quality nutrient data requires lab analysis of samples collected by citizen scientists. The Alliance recognizes the importance of this data for robust watershed report cards. Also, with the Chesapeake Bay Total Maximum Daily Load (TMDL), there is an increasing need for baseline water quality data to help support restoration efforts across the watershed.

The main goal of the program is to continue to provide technical support and training to volunteers, who in turn gather high-quality data for use by VA DEQ, watershed organizations, localities, and other stakeholders. We can only achieve this with the commitment of volunteer citizen scientists and hope to continue to add more sites and volunteers.

Volunteers collect water samples for nutrient analysis.

A volunteer observes excess sediment after Hurricane Irene.

Bacteria sample collection.

Become a RiverTrends Citizen Scientist

Would you like to be a citizen scientist? Here's what it takes to join the RiverTrends water quality monitoring volunteers.

- Attend a training session, where you will learn about the importance of water quality monitoring and how to perform the water quality tests.

- Commit to monitoring a site for preferably twice a month or at a minimum of once a month.

- Enter your monitoring data into an online database.

- Attend a recertification session once a year, where monitoring procedures are reviewed and equipment and chemicals are replaced if necessary.

If you would like to volunteer, please contact the Alliance for the Chesapeake Bay VA Office at 804-775-0951.

Watershed organizations can also get involved through the Train-the-Trainer program, where Regional Coordinators are certified to conduct trainings and provide technical assistance to their volunteer monitors. If your watershed organization is interested in participating, please contact the Virginia office at 804-775-0951.

Volunteers attend a training session.

Monitoring test kits are provided to volunteers.

Publishing Date:
September 2011

Photo credits:
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